

## **CLAIMS**

1. A refrigerated merchandiser comprising:
  - a display case and a cooling module;
  - the display case including a plurality of walls, defining a cavity and a receptacle;
  - 5 the cavity being defined by a back wall, a pair of opposed side walls, a front wall, a top wall and a bottom wall and the receptacle being defined by the back wall, the side walls, the front wall and the bottom wall such that the bottom wall separates the cavity from the receptacle and includes an opening for fluid communication between the receptacle and the cavity;
  - 10 the receptacle being configured to receive the cooling module;
  - a plurality of vertically spaced shelves disposed in the cavity extending between the side walls and including a top surface, a bottom surface and a rear surface;
  - a display zone defined as a volume disposed above the top surface of
  - 15 each shelf for the display of merchandise;
  - a back panel disposed in the cavity adjacent the back wall and spaced therefrom contiguous with the rear surface to define a duct in fluid communication with the bottom wall opening;
  - the back panel including a plurality of elongated openings, each
  - 20 elongated opening disposed in fluid communication with the duct and one of the display zones;
  - a turbulence generating element disposed in each display zone adjacent the elongated opening; and

a cooling module output for refrigerated air in fluid communication  
25 with the bottom wall opening such that the refrigerated air moves through  
the duct and the back panel openings into contact with the turbulence  
generating elements which generate non-laminar airflow thereby blanketing  
the merchandise before falling to a return path.

30 2. The merchandiser as recited in claim 1, wherein the back wall,  
the side walls, the top wall and shelves have a composite construction.

3. The merchandiser as recited in claim 2, wherein the composite  
construction includes at least foam and corrugated cardboard elements.

35 4. The merchandiser as recited in claim 1, wherein the shelves  
have a composite construction including a pair of foam elements each  
having a pair of opposing first sides and a pair of opposing second sides, a  
channel connected to each long side defining a core component, and a  
40 length of corrugated cardboard covering the core components disposed in  
first side abutting relationship.

5. The merchandiser as recited in claim 1, wherein each back  
panel elongated opening extends substantially between the side walls.

45 6. The merchandiser as recited in claim 1, wherein at least one  
shelf has the turbulence generating element connected to the bottom surface  
thereof.

50           7.     The merchandiser as recited in claim 1, wherein the top wall includes an inner surface having the turbulence generating element connected thereto.

             8.     The merchandiser as recited in claim 7, wherein the top wall  
55 includes a second turbulence generating element disposed on the inner surface.

             9.     The merchandiser as recited in claim 1, wherein each elongated opening is disposed adjacent an upper extent of the display zone.

60           10.    The merchandiser as recited in claim 1, wherein the turbulence generating elements are generally vertically aligned.

11. A shelf for use in a refrigerated merchandiser comprising:

a pair of foam elements, each having a pair of opposing first sides and  
a pair of opposing second sides;

a channel element connected to each first side defining a pair of core

5 components; and

a length of corrugated cardboard covering the core components.

12. The shelf as recited in claim 11, wherein the length of  
corrugated cardboard includes opposed ends which overlap when covering

10 the core components.

13. The shelf as recited in claim 12, wherein the overlapping  
opposed ends are connected to the core components by threaded fasteners.

15 14. The shelf as recited in claim 12, wherein a turbulence  
generating elements is formed in the length of corrugated cardboard  
between the overlapping opposed ends.

15. A display case for use with a cooling module to define a refrigerated merchandiser comprising:

a plurality of walls defining a cavity disposed above a receptacle;

the cavity being defined by a back wall, a pair of opposed side walls, a

5 front wall, a top wall and a bottom wall;

the receptacle being defined by the back wall, the side walls, the front wall and the bottom wall and adapted to receive the cooling module;

a plurality of vertically spaced shelves disposed in the cavity extending between the side walls and including a top surface, a bottom surface and a  
10 rear surface;

a display zone defined as a volume disposed above the top surface of each shelf for displaying merchandise;

a back panel disposed in the cavity adjacent the back wall and spaced therefrom contiguous with the rear surface to define a duct;

15 the back panel including a plurality of elongated openings, each elongated opening disposed in fluid communication with the duct and one of the display zones; and

a turbulence generating element disposed in each display zone operatively associated with the respective elongated opening.

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16. The merchandiser as recited in claim 15, wherein the back wall, the side walls, the top wall and shelves have a composite construction.

17. The merchandiser as recited in claim 16, wherein the composite  
25 construction includes at least foam and corrugated cardboard elements.

18. The merchandiser as recited in claim 15, wherein the shelves have a composite construction including a pair of foam elements each having a pair of opposing first sides and a pair of opposing second sides, a  
30 channel connected to each long side defining a core component, and a length of corrugated cardboard covering the core components disposed in first side abutting relationship.

19. The merchandiser as recited in claim 15, wherein each back  
35 panel elongated opening extends substantially between the side walls.

20. The merchandiser as recited in claim 15, wherein at least one shelf has the turbulence generating element connected to the bottom surface thereof.

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21. The merchandiser as recited in claim 15, wherein the top wall includes an inner surface having the turbulence generating element connected thereto.

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22. The merchandiser as recited in claim 21, wherein the top wall includes a second turbulence generating element disposed on the inner surface.

23. The merchandiser as recited in claim 15, wherein each  
50 elongated opening is disposed adjacent an upper extent of the display zone.

24. The merchandiser as recited in claim 15, wherein the turbulence generating elements are generally vertically aligned.

55           25. A method of constructing a very high load capacity yet  
lightweight shelf for use in a refrigerated merchandiser, comprising:

          providing a pair of elongated foam elements, each having a pair of  
opposed first sides and a pair of opposed second sides;

          attaching a C-shaped channel to each first side to define a pair of core  
60 components;

          orienting the core components such that the core components abut  
along first sides thereof;

          covering the abutting core components with a length of corrugated  
cardboard having opposed ends such that one of the opposed ends overlaps  
65 the other; and

          connecting the opposed ends of the length of corrugated cardboard to  
the core components such that the second sides are uncovered.

          26. The method as recited in claim 25, wherein a turbulence  
70 generating element is formed by the overlapping opposed ends of the  
corrugated cardboard.

          27. The method as recited in claim 25, wherein the step of covering  
the core components further includes using threaded fasteners.